SOA in Healthcare Conference

July 13-15, 2011, Hyatt Dulles Hotel, Virginia USA

The Use of SOA Architecture and BRMS (Business Rule Management System) to Execute Medical Rules



Agenda



- Fleury Group
- •Medical Knowledge Codification project-MKC
- SOA Architecture
- Web Service Design
- Results
- Next Steps

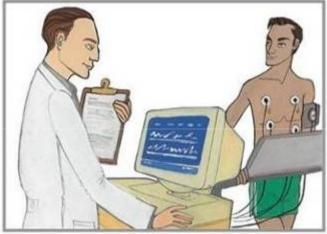
Fleury Group



Vision

Health and well-being for people's full

accomplishments.



Mission

Providing more comprehensive and integrated solutions for people's health and wellbeing management with excellence, humanity and sustainability.

Values

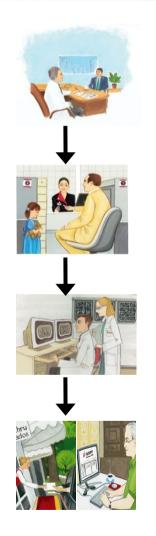
- Focused on the customer
- Integrity
- Innovation [
- Enthusiasm
- Excellence
- Respect
- Interdependence
- Solidarity



Healthcare Sector in Brazil



Selection of medical service provider: patient's choice, influenced by the physician



1. Physician raises a hypothesis, requests a series of tests and suggests where patient should be investigated

2. Patient goes to his trusted medical service provider

3. Medical service (e.g., diagnostic test) is provided

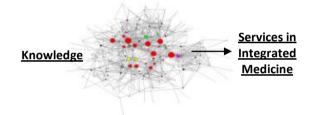
4. Patient receives reports and delivers to physician

Our business



- A Medical Services provider, leader in Diagnostic and Preventive Solutions to clients
 - The most trusted center for diagnostic tests
 - Benefits from scale (5.4 MM patients, 32 MM tests)
- But we go beyond

Knowledge converted into Innovation and Integrated Medical Services





- Fresence in the main Brazilian economic centers
- Positioned for A, B and C plan segments
- Diversification Patient Service Centers, Diagnostic Operations in Hospitals, services for companies, clinical analysis and imaging services, Preventive Medicine
- Differentiation Strategy best choice, "must have" brands

From Knowledge to Differentiation





Pioneer in the implementation of computer system to customer service.



First exams of diagnostic center, pioneer in integrated solutions of diagnostic medicine



Implementation of bar codes for test tubes identification



Fleury was the first company in the world to make available exam results on internet.



Integration of high technology technical area, with worldwide excellence standard

1982

1983

1994

1998

2001



Introduction of integrated reports



Image results on the internet



Test results with historical data



Health assessment diversification



Introduction of health promotion programs

2002

2003

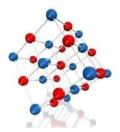
2004

2005

2006

From Knowledge to Differentiation











Knowledge management

Introduction of disease management program

Itaim Patient Service Center

Integrated Medical Centers

2007

2008

2009

2010

- An incubator for Client Experience Innovations
- Use of art & culture in Service Innovation

2011



Future for Innovation....

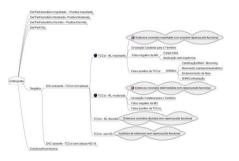
From Knowledge to Competitive Advantage



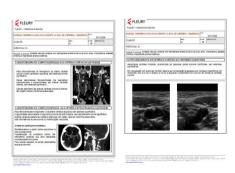


Integrated solutions

Artificial intelligence tools to analyze test results

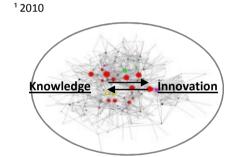


39 medical specialties branches,60 types of integrated reports



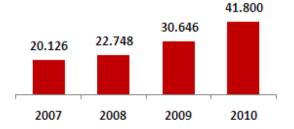
Knowledge generation

- 632 physicians¹
- 172 peer-reviewed published articles
- 313 abstracts in scientific meetings
- 95 book chapters



Medical Consultancy Services 24/7

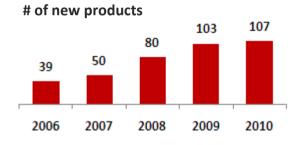
Physicians analyze complex cases and suggest subsequent investigation



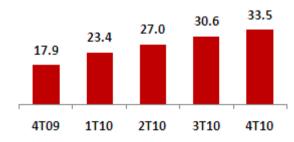
of consultancies registered in electronic medical records



New products



Revenues in BRL millions²

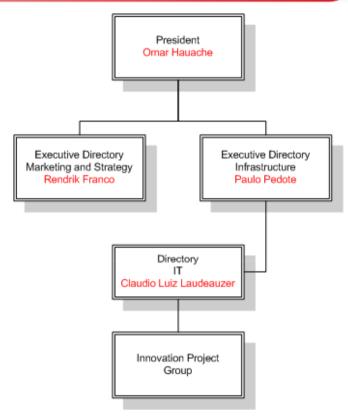


² Last 24 months revenue from products launched in the 24 month period

Innovation Projects Team







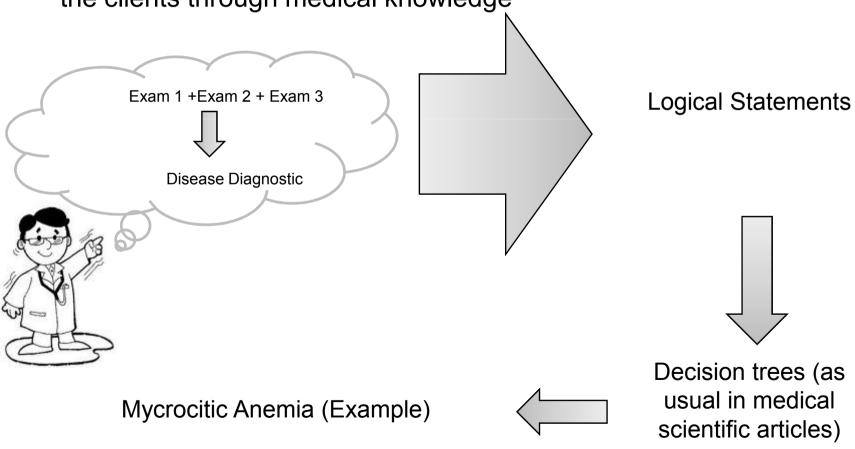
- ✓ Multidisciplinary Team
- ✓ Portfolio of 12 major innovation projects (Evolution Program)
- ✓ Provide the company with IT solutions to sustain the group development
- ✓ Guarantee the legacy architecture transition to SOA
- ✓ Consolidation the activities from COE (Centre of Excellence)

MKC Project Concepts



Main concept and objective

"A system which provides an diagnostic hypothesis automatically to the clients through medical knowledge"



Project Concepts "CCM" Main Process



Exams Values and parameters from Lab Data

Caché Web Service

Exams Values fuzzyfication

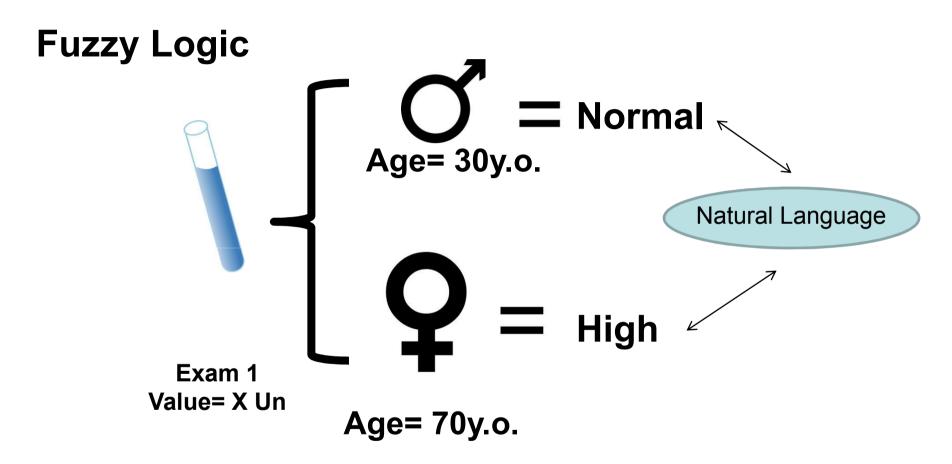
Fuzzy Web Service

Execute rule to emit the diagnostic notes

- Rule Web Service
- Persistent Data Web Service

MKC Project Concepts





[&]quot;Fuzzy logic corresponds to "degrees of truth", while probabilistic logic corresponds to "probability, likelihood"; as these differ, fuzzy logic and probabilistic logic yield different models of the same real-world situations" (Wikpedia)

Project Concepts: Platform and Software chosen



Fuzzy engine



SOA Suite

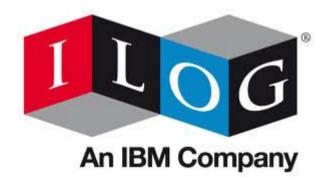




Data Persistence

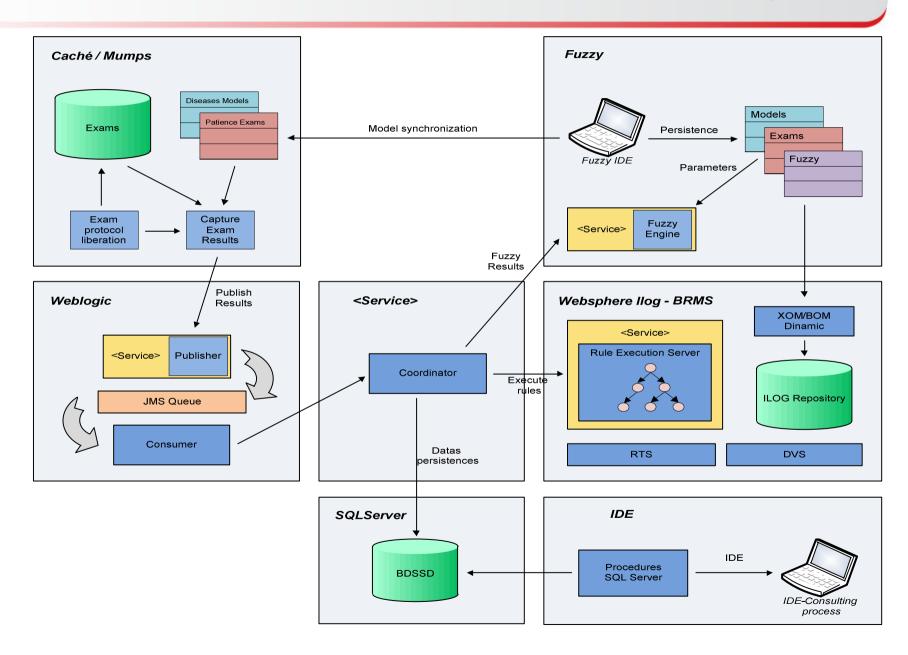


Rule IDE and Egine



SOA Basic Architecture





Web Service design



Service-Orientation Design Principles (by Thomas Erl)

Engine Fuzzy Service

- ✓ Service Reusability
- ✓ Service Autonomy
- ✓ Service Statelessness
- ✓ Service Discoverability

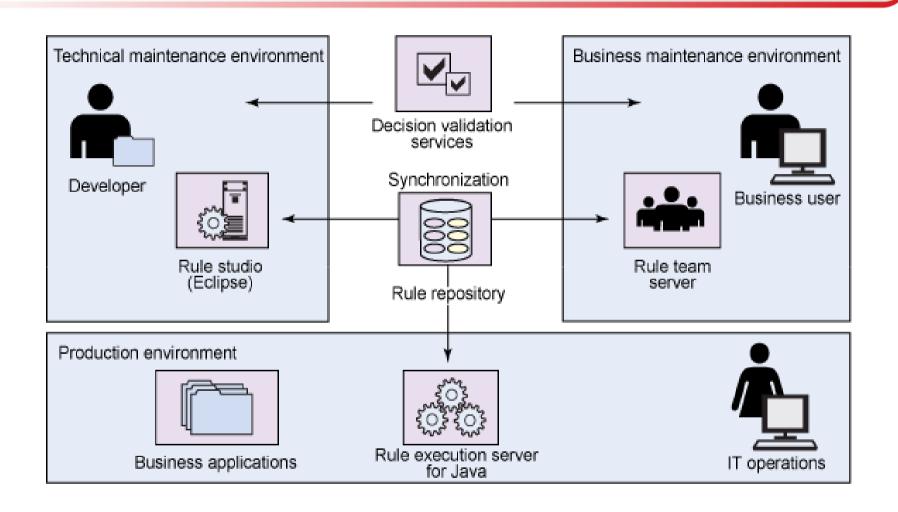
Caché Fuzzy Service

- ✓ Standardized Service Contract
- ✓ Service Reusability
- ✓ Service Autonomy
- ✓ Service Discoverability

** Coordinator Service (Future BPEL implementation)

BRMS-ILOG Jlues (IBM websphere) Grupo C FLEURY





Results -IDE - Medical team Rule Modelation



Demonstrations' Videos

Rule Modelation

- ☐ Model a Decision Tree
- ☐ Model an Action Rules

Rule Simulatio

□Rule test (Using excel)

Results- Patient Diagnostic notes





Results- Medical team Dash board





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Conclusions



- The first production application using SOA Architecture in the Fleury Group
- A very important fuzzy development service
- The first BRMS application using medical rules to emit diagnostic notes to clients
- The project enforces the innovation attitude from the Group Fleury

Future Implementations



- BPEL implementation (coordinator service)
- To maximize the number of processes changing the current architecture
- To develop other applications by using the fuzzy systems design
- To design KMC solutions to Medical Integrated Reports



Thank you

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